Oct. 16, 1945. E. J. SHAW 2,387,094

ARTICLE COATING APPARATUS

Filed Nov. 12, 1943 2 Sheets-Sheet 1

FIG. 1

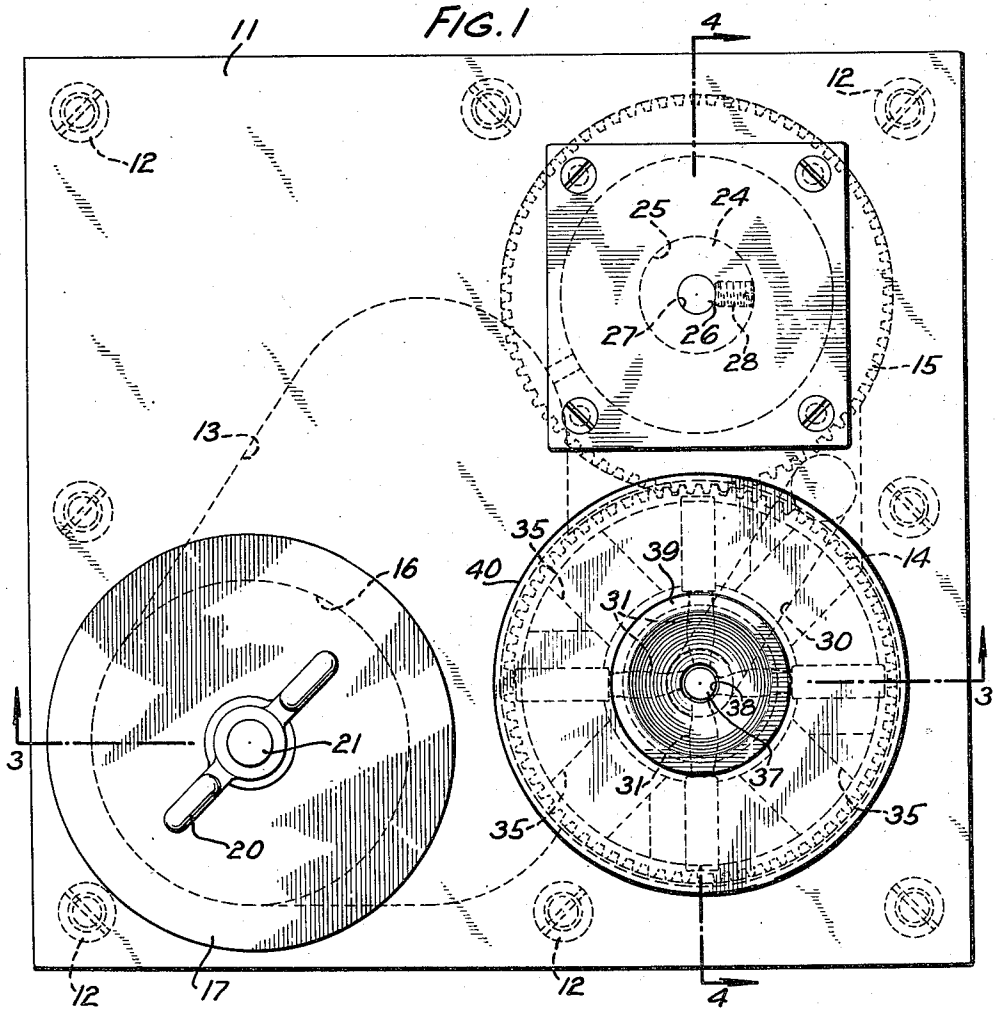
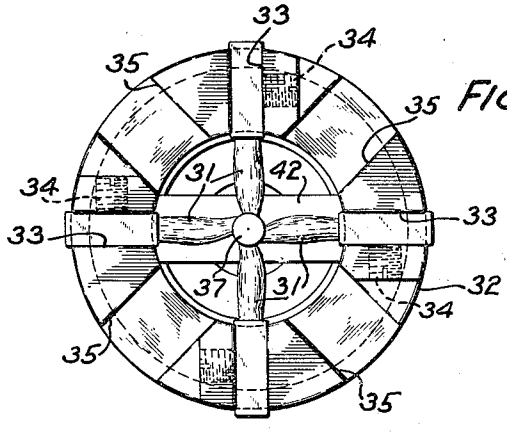


FIG. 2



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Filed Nov. 12, 1943 2 Sheets-Sheet 2

FIG. 3

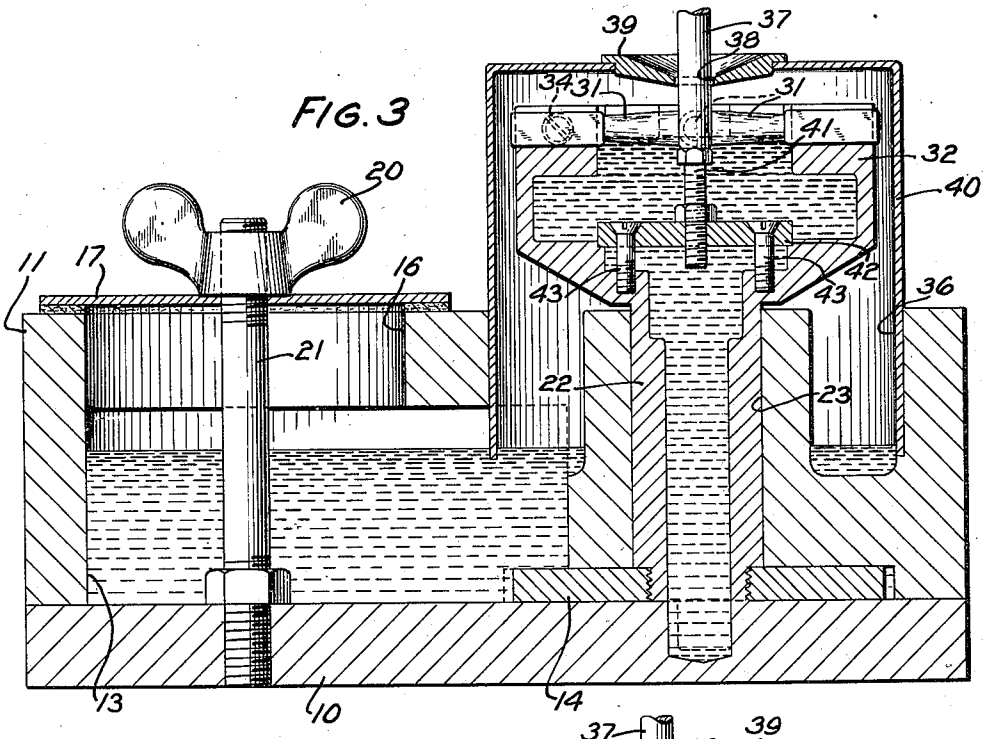
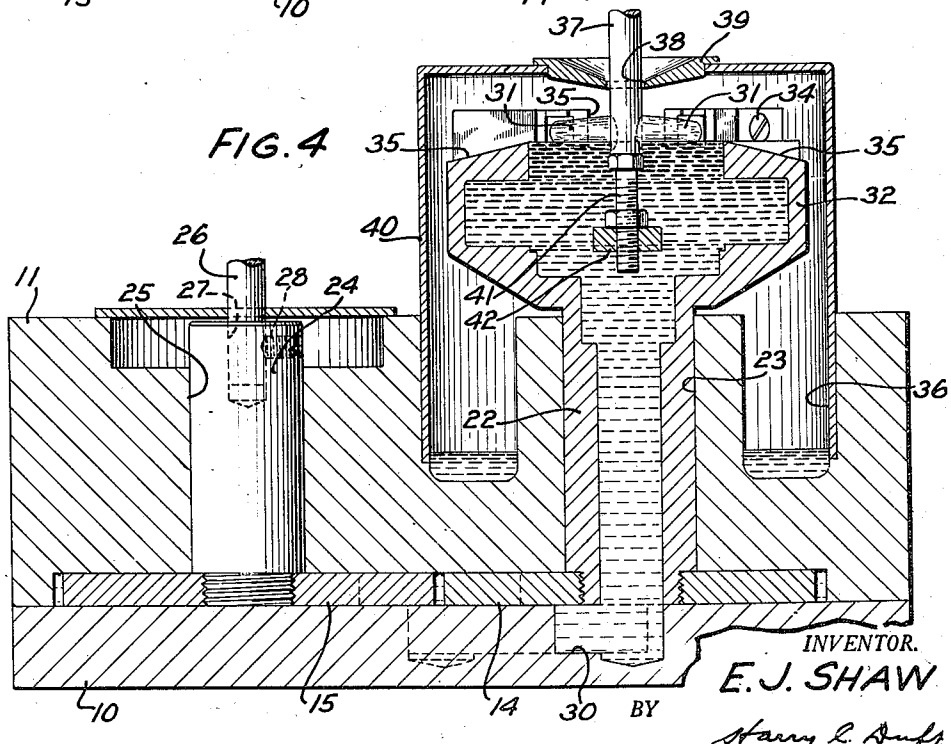


FIG. 4



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ARTICLE COATING APPARATUS

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13 Claims. (Cl. 91—41)

This invention relates to article coating apparatus and more particularly to an apparatus for applying a carbon coating to either end of a cylindrical body, such as a resistor.

In the manufacture of certain types of carbon resistors, it is sometimes the practice to apply a coating of conducting material to either end of the resistor to insure good electrical contact between the resistor and its terminals. Such a coating may be applied by dipping, but is preferably applied by brushing since brushing produces a more uniform and adherent coating.

An object of the present invention is to provide an efficient and effective apparatus for coating the ends of cylindrical bodies such as resistors.

In accordance with one embodiment of this invention, an apparatus may be provided comprising a plurality of radially disposed brushes mounted on the upper end of a hollow rotatable shaft from which coating material is supplied and maintained at a constant level with respect to the brushes by a gear pump positioned in a tank. The unused coating material flows back to the tank and is recirculated through the shaft by the pump.

Other objects and advantages of the present invention will be apparent from the following detailed description taken in conjunction with the drawings, wherein

Fig. 1 is a plan view of the apparatus;

Fig. 2 is a detailed plan view showing the brushes and their supporting section;

Fig. 3 is a vertical sectional view along the line 3—3 of Fig. 1; and

Fig. 4 is a vertical sectional view along the line 4—4 of Fig. 1, taken at right angles to the line in Fig. 3.

Referring now to the drawings, and particularly to Figs. 1 and 3, it will be seen that this coating apparatus comprises a heavy rectangular base plate 10 on which is mounted a housing block 11, the block being fixed to the plate by a number of bolts 12 which are mounted in the plate and threadedly engage the housing block. A large trilateral cavity 13 is formed within the housing block 11 in the left portion thereof, as viewed in Figs. 1 and 3, and serves as a tank from which coating compound may be pumped by a gear pump comprising two intermeshing spur gears 14 and 15, portions of the peripheries of which are disposed within the cavity 13 and at the base thereof. Access to the cavity 13 is provided by a circular aperture 16 formed in the portion of the housing block immediately above the cavity. A cover plate 17 may be placed over the cavity 13 and held in place by a thumb nut 20 which threadedly engages a vertically disposed shaft 21, the lower end of which is mounted on the base plate 10.

The spur gear 14 is mounted on the lower end of a vertically disposed hollow shaft 22, journalled in a bearing 23, formed in the housing block 11, the gears 14 being driven by the second spur gear 15 which is fixed to the lower end of a shaft 24. As may be seen in Fig. 4, the shaft 24 is journalled in a bearing 25 formed in the housing block 11. The lower end of a driving or power shaft 26 extends into a suitable aperture 27 formed in the upper portion of the shaft 24 and is retained therein by a set screw 28. This drive shaft may be rotated by any suitable means, such as a small electric motor.

The gears 14 and 15 cooperatively serve as a gear pump, the gear 14 rotating in counter-clockwise direction, while the gear 15 rotates in a clockwise direction, as viewed in Fig. 1. As the gears are rotated, the coating compound in the reservoir 13 flows between the teeth of the gears moving through the reservoir 13 and the coating compound is carried around to the point at which the gears mesh. Meshing of the gears causes the coating compound to be squeezed out from the teeth thereof and forced into one end of a channel 30 formed in the housing block. This end of the channel, as may be seen in Fig. 1, is positioned slightly ahead of the point at which the gears mesh. Sufficient pressure is developed on the coating compound at this point to force the compound through the channel and to the other end thereof which communicates with the lower end of the hollow shaft 22. The coating compound is forced vertically through the shaft and into contact with a number of brushes 31 which are radially mounted on a flanged upper portion 32 of the shaft 22, the brushes being directed inwardly. This flanged portion forms a cup which is, during the operation of the apparatus, filled with coating compound by the gear pump to a level sufficient to provide an adequate supply of coating material to the brushes 31.

The brushes, which are set in recesses 33 formed in the flanged portion 32, are held in place by set screws 34 associated therewith. As may be seen in Figs. 2 and 3, segmental notches 35 are formed in the flanged portion 32 of the shaft 22 adjacent the brushes 31 and these notches permit unused compound to flow into an annular recess 36 which is formed in the housing 11. A portion of this recess 36 communicates with the cavity 13, as may be seen in Fig.

3, thus permitting the coating compound to return thereto. The depth of the notches 35 is selected to permit the coating compound to fill the flanged portion 32 of the shaft 22 to a sufficient height to provide an adequate supply of coating material for the brushes 31.

In the operation of this apparatus, the power shaft 26 is actuated to rotate the gears 14 and 15 causing thereby, as hereinbefore explained, coating compound to be pumped from the reservoir 13 to the brushes 31. At the same time, rotation of the gear 14 causes the brushes 31 to rotate about the axis of the supporting shaft 22. In practice, the gear pump is preferably operated to circulate coating material for a sufficient time at the beginning of each operation to agitate the coating compound to obtain a uniform dispersion of the particles thereof, a carbon suspension in water, such as Aquadag, being ordinarily employed with this apparatus.

After the coating compound has been properly prepared, one end of a resistor 37, which is to be coated, may be inserted through an aperture 38 formed in the center of a funnel-shaped plate 39 which is fitted in the top of a cylindrical cover 40, the lower portion of which is positioned in the annular recess 36. This cover prevents coating compound from escaping during the operation of the device. The depth to which the resistor may be inserted is controlled by an adjustable stop member 41 which is mounted on a cross member 42 fixed to the interior of the flanged portion 32 of the shaft 22 by a pair of bolts 43. The funnel-shaped plate 39 is employed so that any excess coating material which might be removed from the coating apparatus as the resistor is withdrawn therefrom will be ordinarily returned to the apparatus. The rotating brushes apply a uniform coating over the lower portion of the resistors, the stop member 41 being adjusted to present the desired portion of each resistor to the brushes. After one end of the resistor has been coated, the resistor may be inverted and a similar coating applied to the other end.

While but one embodiment of this invention has been shown and described, it will be understood that many changes and modifications may be made therein without departing from the spirit or scope of the present invention.

What is claimed is:

1. An apparatus for applying a coating to a selected portion of a cylindrical article comprising a housing, a pair of intermeshing spur gears positioned in said housing, a power shaft for supporting and rotating one of said gears, a hollow shaft for supporting the other of said gears, a tank formed in said housing and so disposed that a portion of the peripheries of each of said gears extends therein, said housing having a passage for conducting the material from the gears to said hollow shaft, said gears being rotated to pump coating material from said tank and to force said material up said hollow shaft, and a brush mounted on said hollow shaft so as to be supplied with coating material as coating compound is pumped through said shaft.

2. An apparatus for applying a coating to a selected portion of a cylindrical article comprising a housing, a pair of intermeshing spur gears positioned in said housing, a power shaft for supporting and rotating one of said gears, a hollow shaft for supporting the other of said gears, a tank formed in said housing and so disposed that a portion of the peripheries of each of said gears extends therein, said housing having a passage for conducting the material from the gears to said hollow shaft, said gears being rotated to pump coating material from said tank and to force said material up said hollow shaft, a brush mounted on said hollow shaft so as to be supplied with coating material as coating compound is pumped through said shaft, and a stop member associated with said brush for predetermining the relative position of an article with respect to said brush.

3. An apparatus for applying a coating to a selected portion of a cylindrical article comprising a housing, a pair of intermeshing spur gears positioned in said housing, a power shaft for supporting and rotating one of said gears, a hollow shaft for supporting the other of said gears, a tank formed in said housing and so disposed that a portion of the peripheries of each of said gears extends therein, said housing having a passage for conducting the material from the gears to said hollow shaft, said gears being rotated to pump coating material from said tank and to force said material up said hollow shaft, a brush mounted on said hollow shaft so as to be supplied with coating material as coating compound is pumped through said shaft, and means for returning coating material to said tank.

4. An apparatus for applying a coating to a selected portion of a cylindrical article comprising a housing, a pair of intermeshing spur gears positioned in said housing, a power shaft for supporting and rotating one of said gears, a hollow shaft for supporting the other of said gears, a tank formed in said housing and so disposed that a portion of the peripheries of each of said gears extends therein, said housing having a passage for conducting the material from the gears to said hollow shaft, said gears being rotated to pump coating material from said tank and to force said material up said hollow shaft, and a brush mounted on said hollow shaft so as to be supplied with coating material as coating compound is pumped through said shaft, an annular channel being formed in said housing for returning coating material to said tank.

5. An apparatus for applying a coating to a selected portion of a cylindrical article comprising a housing, a pair of intermeshing spur gears positioned in said housing, a power shaft for supporting and rotating one of said gears, a hollow shaft for supporting the other of said gears, a tank formed in said housing and so disposed that a portion of the peripheries of each of said gears extends therein, said gears being rotated to pump coating material from said tank and to force said material along a channel formed in said housing communicating with said hollow shaft and up said hollow shaft, and a brush mounted on said hollow shaft so as to be supplied with coating material as coating compound is pumped through said shaft.

6. An apparatus for applying a coating to a selected portion of a cylindrical article comprising a housing, a pair of intermeshing spur gears positioned in said housing, a power shaft for supporting and rotating one of said gears, a hollow shaft for supporting the other of said gears, a tank formed in said housing and so disposed that a portion of the peripheries of each of said gears extends therein, said gears being rotated to pump coating material from said tank and to force said material along a channel formed in said housing communicating with said hollow shaft and up said hollow shaft, and a brush mounted on said hollow shaft so as to be supplied with coating material as coating compound is pumped through

said shaft, an annular channel being formed in said housing for returning coating material to said tank.

7. A coating apparatus comprising a hollow vertical shaft, a cup-shaped member at the upper end thereof, a brush mounted on said cup-shaped member and directed inwardly, a reservoir for coating compound, and means for causing said compound to flow upwardly through said hollow shaft and into said cup-shaped member to maintain a predetermined level of said compound at the brush.

8. A coating apparatus comprising a hollow vertical shaft, a cup-shaped member at the upper end thereof, a brush mounted on said cup-shaped member and directed inwardly, a reservoir for coating compound, means for causing said compound to flow upwardly through said hollow shaft into said cup-shaped member to maintain a predetermined level of said compound at the brush, and means for returning said compound to said reservoir.

9. A coating apparatus comprising a hollow vertical shaft, a cup-shaped member at the upper end thereof, a brush mounted on said cup-shaped member and directed inwardly, a reservoir for coating compound, and means for agitating said compound in said reservoir and for causing said compound to flow upwardly through said hollow shaft into said cup-shaped member to maintain a predetermined level of said compound at the brush.

10. A coating apparatus comprising a hollow vertical shaft, a cup-shaped member at the upper end thereof, a brush mounted on said cup-shaped member and directed inwardly, a reservoir for coating compound, means for agitating said compound in said reservoir and for causing said compound to flow upwardly through said hollow shaft into said cup-shaped member to maintain a predetermined level of said compound at the brush, and means for returning said compound to said reservoir.

11. An apparatus for applying a coating to a selected portion of a cylindrical article comprising a housing, a pair of intermeshing gears cooperating with said housing to form a pump, a hollow shaft associated with one of said gears, a tank communicating with a portion of said gears, means for conducting the discharge from the pump to said hollow shaft, a driving connection to one of said gears for rotating said gears and pumping said material from said tank and forcing it up the hollow shaft, and a brush mounted on said hollow shaft so as to be supplied with coating material as said material is pumped through the shaft.

12. An apparatus for applying a coating to a selected portion of a cylindrical article comprising a housing, a pair of intermeshing gears cooperating with said housing to form a pump, a hollow shaft associated with one of said gears, a tank communicating with a portion of said gears, means for conducting the discharge from the pump to said hollow shaft, a driving connection to one of said gears for rotating said gears and pumping said material from said tank and forcing it up the hollow shaft, a brush mounted on said hollow shaft so as to be supplied with coating material as said material is pumped through the shaft, and means for returning said coating material to said tank.

13. An apparatus for applying a coating to a selected portion of a cylindrical article comprising a housing, a pair of intermeshing gears cooperating with said housing to form a pump, a hollow shaft associated with one of said gears, a tank communicating with a portion of said gears, means for conducting the discharge from the pump to said hollow shaft, a driving connection to one of said gears for rotating said gears and pumping said material from said tank and forcing it up the hollow shaft, a brush mounted on said hollow shaft so as to be supplied with coating material as said material is pumped through the shaft, and means for positioning an article with respect to said brush.

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